

Cornus sp. (cf. living *C. circinata*)
Crataegus sp. (cf. living *C. pinnatifida*)
Equisetum sp. (cf. living *E. hyemale*)
Nymphaeophyllum gen. et sp. nov.
Ostrya oregoniana Chaney (fruit sac)
Peltandra sp. nov.
Populus balsamoides Goepf.
Populus sp. (cf. living *P. grandidentata*)

These, along with other species, will be discussed in future publications.

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ZOOLOGY.—*Contributions to Texas herpetology. III. Bullsnares of the genera Arizona and Pituophis.*¹ CHARLES E. BURT, Southwestern College. (Communicated by L. STEJNEGER.)

Four species of bullsnares of the genera *Arizona* and *Pituophis* are now known to occur in Texas, *P. melanoleucus ruthveni* being here reported from the state for the first time. Distinguishing characters of the species are presented in the following key.

1. Keels present on some or all of the dorsal scales..... 2
 Dorsal scales smooth.
 Arizona elegans elegans (Kennicott).
2. Normally with not more than one upper labial (4 or 5) bordering eye 3
 Two upper labials (3-4 or 4-5) bordering eye. Southern Texas.
 Pituophis deppei deppei (Duméril and Bibron).
3. Dark dorsal saddles on body and tail more than 56.
 Pituophis sayi sayi (Schlegel).
 Dark dorsal saddles on body and tail 56 or less. Eastern Texas.
 Pituophis melanoleucus ruthveni (Stull).

These four species resemble each other in being large, beneficial, non-poisonous, carnivorous, field-inhabiting forms with many dark blotches or saddles on the back.

Arizona elegans elegans (Kennicott)

This snake has been reported from Texas, west of the 98th meridian (Blanchard, 1925, p. 22). A dead example removed from the road 11

¹ Received May 15, 1934.

miles north of Encino, Brooks County, on April 4, 1931, occurred at a point almost precisely on the 98th meridian. It had 31 scale rows at the middle of the body. The United States National Museum has three Texan specimens of this form. The type (No. 1722) from the Lower Rio Grande Valley is faded but well preserved. Two examples from Bexar County were taken at San Antonio (Hurter Coll., May 19, 1908) and Somerset (A. J. Kirn, Mar. 12, 1926) respectively.

Pituophis deppei deppei (Duméril and Bibron)

This form is typically a native of Mexico, but Stull (1932) has indicated that it ranges northward in Texas as far as San Marcos, Hays County.

Pituophis melanoleucus ruthveni Stull

A bullsnake, secured on May 9 on the road near a plot of grass 5 miles southeast of Zavalla, Angelina County (U.S.N.M. No. 83672), in the sandy cut-over pine barren region of eastern Texas, resembled *sayi* of more western and northern areas so closely that it was presumed to be that form until it was identified in the laboratory. Here it was soon found to have the reduced number of dorsal saddles or blotches assigned to "*P. melanoleucus ruthveni*" by Stull (1929), rather than the higher number specified for the form which was termed "*P. sayi sayi*" in the same publication. This led to the identification of the specimen at hand as *ruthveni* (thus introducing the form into the state of Texas) and to a charting of the characters of the several bullsnakes from the critical region in Texas and Louisiana to see if an implication of continuous and progressive geographical variation might be drawn for these snakes. The following table presents these data:

TABLE 1.—VARIATIONS OF PITUOPHIS IN EASTERN TEXAS AND IN LOUISIANA

Locality	La. (type) Rapides Parish	La. (paratype) Rapides Parish	Texas Angelina Co.	Texas Ellis Co.	Texas Clay Co.
Scale formula	31-33-25	31-31-22	31-28-21	31-33-25	31-33-25
Ventrals	219	218	213	223	215
Caudals	59	60	56	62	56
Labials	9-8/15	8/14	9-8/13-14	8/12	9/13
Postoculars	4	3	2-3	3	3
Dorsal saddles on tail	9	?	10	12	12
Dorsal saddles on body	41	?	42	48	54
Total saddles	50	?	52	60	66

Before discussing the taxonomic significance of the above data, attention is called to the geographical position of each of the individuals concerned. The type and paratype of *ruthveni* are from Rapides Parish, central Louisiana, and the additional specimen of *ruthveni* is

from Angelina County, eastern Texas, in a line almost directly west of the type locality. The specimen of *sayi* from Ellis County, Texas, is from a point east of the previously known range of *sayi* and in this way it represents the closest known geographical approach of the range of *sayi* to the range of *ruthveni*; whereas the example of *sayi* from Clay County, Texas, is near the previously known eastern border of the area occupied by *sayi*, but yet far enough north to be considered as more nearly representative of the typical form. Here, then, we find a fine geographical range of specimens arranged in a line from central Louisiana to north-central Texas.

From the standpoint of scutellation, the table reveals no particularly significant differentiation between the eastern and western stocks, even the type specimens of *ruthveni* having the exact scale formula of examples of *sayi* from Ellis and Clay counties, Texas.

But, from the standpoint of the color pattern, with specific reference to the number of dorsal saddles (which seems to be the only significant criterion advanced in the original diagnosis of *ruthveni* for its separation from *sayi*), there is a definite correlation. Originally the gap between *ruthveni* and *sayi* appeared to be wide—perhaps a matter of 15 dorsal saddles as obtained in comparing the extremes in the above table (50 to 66 saddles) but, in parallel with the development in many similar cases, additional specimens from intervening areas here greatly reduce the known differentiation between the two populations. Thus, we find that the known number of dorsal saddles is raised two in *ruthveni* by the specimen from eastern Texas (52 saddles) and lowered six in *sayi* through the example from Ellis County, central Texas (60 saddles); and the fact that this leaves a gap of only seven saddles between the diverging extremes concerned bears taxonomic significance in making it obvious that *ruthveni* and *sayi* must ultimately be ranked as subspecies² of each other and that therefore the taxonomy indicated in the original description of *ruthveni* must be changed in some way.³ Published data of intergradation between *ruthveni* and a subspecies of *melanoleucus* have not been advanced, although Mr. Percy Viosca, Jr., has informed me that certain eastern Louisiana specimens that he has seen are approximately intermediate

² Speaking generally from what is known of the variation of other herpetological forms in this region (particularly those of the genera *Lampropeltis*, *Masticophis*, *Tanilla* and *Cnemidophorus*), it seems logical to assume that the collecting of additional bullsnakes in eastern and central Texas will enable us to bring these significantly approaching extremes of variation in two subspecies of *Pituophis* closer and closer together, thus ever more definitely revealing the somewhat superficially concealed intergradation between them.

³ This view has been expressed by Dr. Frank N. Blanchard in a written communication.

between *ruthveni* and *lodingi*. If this is revealed and if *lodingi* in its turn intergrades with the true *melanoleucus* that occurs still further east, a whole chain of geographical races or subspecies of the long known *melanoleucus* will be placed in evidence. Such action is not unlikely. The ultimate series may include the following forms: *melanoleucus*, *mugitus* (southern Florida), *lodingi* (Alabama and probably Mississippi), *ruthveni*, *sayi* and *affinis* (west Texas). Pending the appearance of data contained in Dr. Stull's forthcoming revision of the genus *Pituophis*, and also in anticipation of further field work in eastern Texas and in Louisiana, the present writer feels that nothing is to be gained by making a nomenclatorial change here in the proposed status of either *ruthveni* or *sayi*.

Pituophis sayi sayi (Schlegel)

Several representatives of this form were collected near grassy areas from whence they had wandered to cement pavement to be killed by passing automobiles. Data pertaining to some of these individuals have been presented and interpreted above under *ruthveni*, which appears to intergrade with this form. The following U.S.N.M. and personal records of *sayi* are available, including that of the type (No. 1540) and a paratype (No. 1541) of the synonymous *mcclellanii* from Deaf Smith County. Reports are by counties.

BORDEN: Gail (Vernon Bailey). CARSON: 6 mi. W. Groom (May 28, 1934). CLAY: 1 mi. N. W. Jolly (Apr. 18, 1931). CROSBY: 2 mi. N. W. Crosbyton (Luther Hoyle, June 13, 1933). DEAF SMITH: Red River Valley (R. B. Marcy and Geo. B. McClellan, June 28, 1852). DONLEY: Jericho (May 28, 1934). ELLIS: 1 mi. N. W. Waxahachie (May 26, 1931). FOARD: 3 mi. N.E. Thalia (Luther Hoyle, June 11, 1933). GRAY: 1 mi. W. Alanreed (May 28, 1934). MOORE: Dumas, and 1 mi. N. Etter (May 28, 1934). PECOS: 12 mi. N. E. Ft. Stockton (Luther Hoyle, June 16, 1933). POTTER: 8 mi. E. Amarillo (May 28, 1934). PRESIDIO: Paisano (Wm. Lloyd, July 21, 1890). REEVES: 1 mi. S. Red Bluff (Aug. 12, 1934). SHERMAN: 3 mi. S. W. Texhoma, and 2 mi. N. E. Stratford (May 28, 1934). VAL VERDE: Cave, 20 mi. N. Comstock (J. H. Gaut, May 9, 1903).

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